

CAR BUILDERS OWE DEBT TO RACING

Advances Are Traceable Directly to Contests, Porter Finds.

DESIGN MUCH IMPROVED

And Developments in Many Other Respects Due to Competition.

Credit for a large number of the improvements in design and even in manufacture is put to the account of racing by Porter, designer of the Mercer Grand Prize winner, in a paper read not long ago before the metropolitan section of the Society of Automobile Engineers. The experiments made with the idea of building a winning car have brought results subsequently introduced into passenger car building and called for more advanced methods of manufacturing.

"We can readily understand that while the advances made in manufacturing processes are not usually attributed to the effects of racing, they are most assuredly a direct result from it," said Mr. Porter. "Light reciprocating parts also became a necessity, which demanded the use of the highest class of material, and in an effort to decrease the angularity of the connecting rod, permitting the use of longer strokes without any greater loss in transmitting the explosive force to the crank pins, very long connecting rods became a necessity. Chrome vanadium steel for these parts stressed to 60,000 pounds per square inch I have used successfully, while steel pistons turned to a thickness at the lower end of less than one-sixteenth of an inch have proved satisfactory in every respect. These two important factors are receiving a marked degree of attention from all designers, and while they are not in common use in stock production as yet there is no doubt that within the next two years they will be accepted as necessities in the stock car."

"These several attempts to increase motor efficiency have forced upon us a marvelous increase in piston speed, and positive results have been obtained that no doubt would never have entered the designer's mind when considering stock production. As an important factor bearing on the matter of piston speed, valve timing has come in for a generous share of consideration, and while experiments

possible only as a result of the wonderful development of the four cylinder and poppet valve types. The L head motor is another type that apparently has no value as a racing motor, but in an endeavor to decrease weight, this form of construction no doubt had its inception. The fact that a single camshaft resulted in greater quietness was a development rather than a consideration when first designed.

"The streamline body, developing as it has into one of great favor, since the comfort possible is so great, was to my mind a direct result of the wonderful advantages shown in racing bodies, developed purely as a means of decreasing the wind resistance, which is such a great detriment to speed. The wire wheel proposition, which is now so widely advertised as a means of easy riding and long tire life, had its inception in racing as a means to an end, which was to get an exceptionally strong wheel with a great decrease in weight. The development came along with the recognized necessity of lightness in the unsprung parts and was by no means the smallest factor that had to be dealt with. The easy riding qualities of this wheel, so talked of to-day, would hardly have been known if necessity had not demanded its construction.

"Generally and in conclusion I would state that even in the midst of such wonderful examples of the modern designer's ability and bearing in mind the wonderful development introduced by our metallurgists, it is surprising to note the new things to be learned at every race meet. Prominent among these is the fact that so many undue stresses on the chassis seem to occur that cannot be figured to any way, but are demonstrated in the racing car. This applies to all parts of the car and illustrates fully that fatigue resisting metals must be used practically throughout.

"Although all designers do not participate in racing the general results shown and talked of are found to be the subject for discussion in almost every quarter, consequently in stating that my belief is that racing is directly responsible for the development of the modern automobile, which means that manufacturing facilities must keep pace with its development, I have no fear of contradiction, provided the subject be given unbiased consideration."

AVOID KNOCKING.

That Is, If You Are a Motor-Racer May Be at Fault.

A "knock" is an unwelcome sound to any automobile or motor boat owner, and when it first appears there are good reasons for making prompt investigation. "Knocking" is due to several causes and is a warning that either a want of harmony and proper cooperation exist between the various parts of the engine, lowering its power producing efficiency, or a looseness in rod or bearing has developed, which means unusual friction and wear, with breakage as the sequence. Investigation will bring the blame home

Pulling Illinois Out of the Mud



Good Roads Days are the usual thing out West. Residents of a section get out and do some neighborhood road repairing. Here is Gov. Dunne talking to the citizens of Mooseheart, Ill. He turned the first spadeful on the new State aid road and initiated the new White good roads tractor into Kane county road work.

to obtain mileage from his truck first and from his tire second. By so doing he obtains a low truck operating cost per mile.

Tires of hard compound have been offered where high mileage guarantees have been made. Under perfect road conditions a hard tire would seem to be desirable because with no obstacles in the path of the truck it would gradually wear down, giving long mileage.

This could not and did not work out in practice, however, because the average American road conditions are far from perfect and the force of the impact occasioned by the hard tire meeting every road obstruction is not distributed, but is confined at one point. This causes the cutting or tearing out of the tire at the point of impact, and the shock is transmitted through the wheel and axle direct to the mechanism of the car, tending to loosen the parts or jar them out of true.

Another important point against the hard tire is that under existing road

BRITISH EXPERT TELLS OF OVERLAND'S POINTS

No Friend of the "Cheap and Nasty" American Car, but Here's Something to Praise.

An appreciation is always welcome, but when it comes from one who has always been an avowed enemy it is especially gratifying. That is the reason the Willits-Overland Company of Toledo, Ohio, is proud of an article which appeared recently in the *Illustrated News* of London, England, from the pen of W. Whittall, regarded as one of the most able automobile authorities of the Old World. The English people have for many years been somewhat inclined to belittle the efforts of American motor car makers, and the medium priced car produced in large quantities has come in for a special share of condemnation. From a personal of Mr. Whittall's article it begins to look as though our British countrymen were at last inclined to give us some credit. The article is in part as follows:

"Last week I set down some conclusions upon American cars in general, and since then I have had occasion to become more closely acquainted with one in particular—the Overland. This is not one of the very cheapest of the American importations, since it costs some \$275, all on, but, considering what is given for the money, it is extremely exceedingly fine value for the money."

"A big, able engine, three speed gear box, electric self-starter and lighting system, magnificent brakes, most comfortable and roomy seating accommodations for five, hood, screen, lamps, speedometer, tools—everything complete, in fact, save the petrol to drive away with, and that you must buy yourself."

"And as to its running. Well, I found the car to run as well as it looks, which is saying a great deal. Quite fast on the level, and with a wonderful good acceleration, and a fine hill climber without, I really do not see what more can be desired by the average motorist than the Overland will give. As readers of this column are well aware I am no particular friend of the cheap American vehicle, but this Overland car is one which would convert the most determined opponent of the transatlantic car. No that I need conversion for the reason that my strictures have always been directed against the cheap and nasty variety solely, and I have invariably striven to hold the scales fairly, recognizing merit where merit is present. And certainly it is present in the Overland, and that to a very remarkable degree."

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TIRES ON OPPOSED WHEELS.

Play of Differential Has to Be Taken Into Consideration.

"Equipping an automobile with non-skid tires is a diametrically opposite wheel, so that one front and one rear wheel are so furnished, is perhaps effective as far as regards the tendency to prevent skidding, but it brings into consideration some points of car construction that the motorist will do well to ponder deeply before taking up with this method," says Horace De Lissier of the A. A. A. Rubber Company, makers of A. A. A. tires.

"This arrangement, because one tire on the rear is slightly larger in circumference than the other, throws the drive on a single wheel, thereby bringing the differential into play constantly into play. They are not supposed to be always at work when they are, the drive is through one wheel and the other is dragging. This means wear on the gears, loss of power and finally tears out of alignment. A result of this sort no motorist wants to attain. Non-skid all round may mean more at the start but less in the end."

PLANTATION RUBBER.

Much of It Grown and "Crude" Situation Is Relieved.

"The development of plantation rubber," which in the past few years has not only brought down crude rubber prices but changed the world's basic supply, has had a marked effect on the tire making industry," says an official of the Goodrich company. "This in turn has worked an advantage to tire users and the whole automobile industry."

"Four or five years ago Brazil produced most of the world's high grade crude rubber supply, and the price per pound was steadily rising. It reached \$3 a pound in 1910 and the supply was not nearly up to the demand, so that a serious crisis was in sight and there was danger that the prices of rubber products such as tires would become prohibitive and seriously retard the development of the automobile."

"Meantime far sighted men and companies had established vast plantations of young growing rubber trees, easily accessible instead of being located in remote jungles, and susceptible of the best scientific training. At first the product of these plantations was very small, but it has grown year after year until it is now greater than the wild rubber supply and has not even now reached its full development. Crude rubber has recently been as low as 50 cents a pound. Recently there has been a little rise, but indications are that the trend will be gradually downward for some time, until a rock bottom price, on the basis of a full development of the plantation system, has been reached."

"Brazil, which in the beginning did not take seriously the menace of the plantations, failed to protect herself, either with extensive plantations of her own, or by improving facilities for gathering her wild product and preparing it for market, so now the big basis of the crude supply is in other parts of the tropical world, such as Ceylon and the Philippines, and

AUTOMOBILE SECURITIES.

| | | |
|------------------------------------|--------|---------|
| Alex-Greif Rubber Co. com. | 15 | 100 |
| Alex-Greif Rubber Co. pf. | 10 | 100 |
| Aluminum Castings pf. | 10 | 100 |
| Chalmers Motor Co. com. | 41 | 85 |
| Chalmers Motor Co. pf. | 30 | 215 |
| Chalmers Tire and Rubber Co. com. | 100 | 100 |
| Firestone Tire and Rubber Co. com. | 100 | 100 |
| Garford Co. pf. | 70 | 90 |
| General Motors Co. com. | 75 | 294 |
| General Motors Co. pf. | 90 | 100 |
| H. F. Goodrich Co. com. | 26 1/2 | 26 1/2 |
| H. F. Goodrich Co. pf. | 49 1/2 | 50 1/2 |
| Goodyear Tire and Rubber Co. com. | 175 | 175 |
| Goodyear Tire and Rubber Co. pf. | 95 | 95 1/2 |
| Gray & Davis Co. pf. | 95 | 100 1/2 |
| International Motor Co. com. | 5 | 5 |
| International Motor Co. pf. | 5 | 5 |
| Kelly-Springfield Tire Co. com. | 52 | 54 |
| Kelly-Springfield Tire Co. pf. | 135 | 140 |
| Lozier Motor Co. com. | 80 | 81 |
| Lozier Motor Co. pf. | 80 | 81 |
| Maxwell Motor Co. com. | 30 | 30 1/2 |
| Maxwell Motor Co. pf. | 30 | 30 1/2 |
| Maxwell Motor Co. 23 pf. | 14 1/2 | 15 |
| Miller Rubber Co. com. | 100 | 100 |
| Packard Motor Co. com. | 100 | 100 |
| Packard Motor Co. pf. | 94 | 95 |
| Perkins Motor Co. com. | 18 | 25 |
| Perkins Motor Co. pf. | 20 | 20 |
| Pope Manufacturing Co. com. | 10 | 10 |
| Pope Manufacturing Co. pf. | 10 | 10 |
| Portage Rubber Co. com. | 30 | 30 |
| Portage Rubber Co. pf. | 30 | 30 |
| Reo Motor Car Co. com. | 34 1/2 | 35 |
| Reo Motor Car Co. pf. | 34 1/2 | 35 |
| Stewart-Warner Speedometer Co. pf. | 40 | 50 |
| Stewart-Warner Speedometer Co. pf. | 50 | 50 |
| Studebaker Co. com. | 32 1/2 | 33 1/2 |
| Studebaker Co. pf. | 50 | 50 |
| Swinehart Tire Co. com. | 50 | 50 |
| Swinehart Tire Co. pf. | 50 | 50 |
| T. S. Rubber Co. com. | 100 | 100 |
| T. S. Rubber Co. pf. | 100 | 100 |
| White Co. pf. | 100 | 100 |
| Willits-Overland Co. com. | 60 | 60 |
| Willits-Overland Co. pf. | 60 | 60 |

Cars That Compose the Field for the 500 Mile Race on Memorial Day

| No. | Car. | Nation. | Cyl. | Stroke. | P. Disp. | Driver. |
|-----|-------------------|----------|------|---------|----------|--------------|
| 1— | Burman | American | 4 | 5.1X5.5 | 449.4 | Burman |
| 2— | Stutz | American | 4 | 5.1X5.5 | 449.4 | Cooper |
| 3— | Stutz | American | 4 | 5.1X5.5 | 449.4 | Oldfield |
| 4— | Gray Fox | American | 4 | 5.1X5.5 | 431.9 | Wilcox |
| 5— | Beaver Bullet | American | 4 | 5.1X5.5 | 449.4 | Keene |
| 6— | Peugeot | French | 4 | 3.9X7 | 341.7 | Goux |
| 7— | Peugeot | French | 4 | 3.9X7 | 341.7 | Boillot |
| 8— | Maxwell | American | 4 | 4.2X8 | 445 | Tetzlaff |
| 9— | Sunbeam | English | 6 | 3.1X5.9 | 245 | Chassaigne |
| 10— | Delage | French | 4 | 4.1X7 | 380.2 | Guyot |
| 12— | Excelsior | Belgian | 6 | 3.8X6.2 | 446.6 | Christians |
| 14— | Peugeot | French | 4 | 3.1X5.9 | 183 | Dunay |
| 15— | King | American | 4 | 5.1X5.5 | 449.4 | Klein |
| 16— | Delage | French | 4 | 4.1X7 | 380.2 | Thomas |
| 17— | Burman | American | 4 | 5.1X5.5 | 449.4 | Thomas |
| 18— | Mercedes | German | 6 | 4.1X5.5 | 445 | De Palma |
| 19— | Mercedes | American | 4 | 4.8X6.2 | 445 | Wishart |
| 21— | Mercedes | American | 4 | 4.8X6.2 | 445 | Brage |
| 22— | Mercedes | American | 4 | 4.8X6.2 | 445 | Pullen |
| 23— | Mercedes | German | 4 | 4.4X7.2 | 448 | Mulford |
| 24— | Stutz | American | 4 | 4.2X8 | 445 | Anderson |
| 25— | Maxwell | American | 4 | 4.2X8 | 445 | Carlson |
| 26— | Marmion | American | 4 | 4.5X7 | 445 | Dawson |
| 27— | Sunbeam | English | 6 | 3.1X5.9 | 273 | Grant |
| 28— | Stutz | American | 4 | 4.2X5.1 | 290.7 | Gallahan |
| 29— | Metropolitan | American | 4 | 4.2X7.1 | 446 | Horan |
| 31— | Keeton | American | 4 | 5.1X5.5 | 449.4 | Keeton |
| 32— | Maxwell | American | 4 | 4.2X8 | 445 | Keeton |
| 33— | Texas | American | 4 | 5.1X5.5 | 449 | Clark |
| 34— | Bugatti | German | 4 | 3.9X7.1 | 350 | Friedrich |
| 35— | Great Western | American | 4 | 4.2X8 | 445 | Jenkins |
| 36— | Great Western | American | 4 | 3.7X5.7 | 254 | Prie |
| 37— | Great Western | American | 4 | 4.2X8 | 445 | Prie |
| 38— | Braender Bull Dog | American | 4 | 4.3X6 | 350 | Chandler |
| 39— | Pope Bullet | American | 4 | 4.7X5.7 | 407 | Roberts |
| 41— | Washington | American | 4 | 4.7X5.7 | 407.6 | Stringer |
| 42— | Duesenberg | American | 4 | 4.4X6 | 360.5 | Rickenbacher |
| 43— | Duesenberg | American | 4 | 4.4X6 | 360.5 | Rickenbacher |
| 44— | Mason | American | 4 | 4.4X6 | 360.5 | Mason |
| 45— | Tatler | American | 4 | 4.1X5.3 | 286 | Mazzucco |
| 46— | Rayfield | American | 6 | 4.1X5.5 | 422.6 | Hughes |
| 47— | Titze | American | 4 | 5.1X5.5 | 449.4 | Titze |
| 48— | Ray | American | 4 | 5.1X5.5 | 449.4 | Brock |
| 49— | Isotta | Italian | 4 | 4.7X6.3 | 443.8 | Isotta |

GOOD MILEAGE FOR SIX.

Buick Shows Better Than 24 Miles to a Gallon.

Gasoline mileage tests with the Buick six in the 1914 season have been good. Such a car recently made 24.29 miles to the gallon in a semi-official test in Charlotte, N. C. The week previous, in Augusta, Ga., another six of the same make made 24.5 miles to the gallon. Both runs were officially observed and sworn to. In Chicago, the latter part of January,

Very little difficulty was experienced in its framing, as long stretches of good natural roads were found in Arizona, New Mexico and Texas. In fact, the one great problem of the A. A. A. pathfinder was to select the "one best way" from the number of options offered at several points, notably east of Phoenix. For the first time the Southwestern and Gulf

Just to Show His Versatility



This is one E. J. Fillard winning \$100 by driving his Ford car up three flights of steps by the Duluth, Minn., court house. "Duluth has no more hills."

The Buick six made 20.1 miles a gallon of gasoline on slippery roads and against a 23 mile wind. This run was also officially observed. The six averaged 19 miles a gallon in a time-official run from Oakland to Fresno, Cal., also in January. On snowy Ohio roads and backing a stiff wind the six made 18.5 miles to the gallon out of Columbus.

"It has been a wonderful Buick season," says "Trailland" Collins. "We have broken mileage records for sixes, climbed the Andes for the first time in history and come through the French reliability run with a perfect score, the only team to finish without the loss of a member."

States will be placed on a through line across lower Arizona, New Mexico and upper Texas.

PROTECTS AUTOMOBILE PLANT.

Wall to Prevent Damage for Another Flood Season.

As the anniversary of the flood of last spring approaches, Indianapolis has taken extensive precautions to guard against a repetition of similar conditions this year. Chief among the measures to protect West Indianapolis is the construction of a rock bound embankment along White River. The barrier extends well above the high water mark of last year and gives ample protection to that district.

The embankment protects not only the Marion Motor Car factory, but also the shipping facilities, so that there will be little trouble at any point. It is not working over the prospects for spring. Coming as it did, at the end of the shipping season last year, the flood handicapped us to a certain extent. It was secured a heavy spring business, but look for no holding in our manufacturing operations or shipping arrangements," says J. H. Bump, general sales manager of the Marion company.

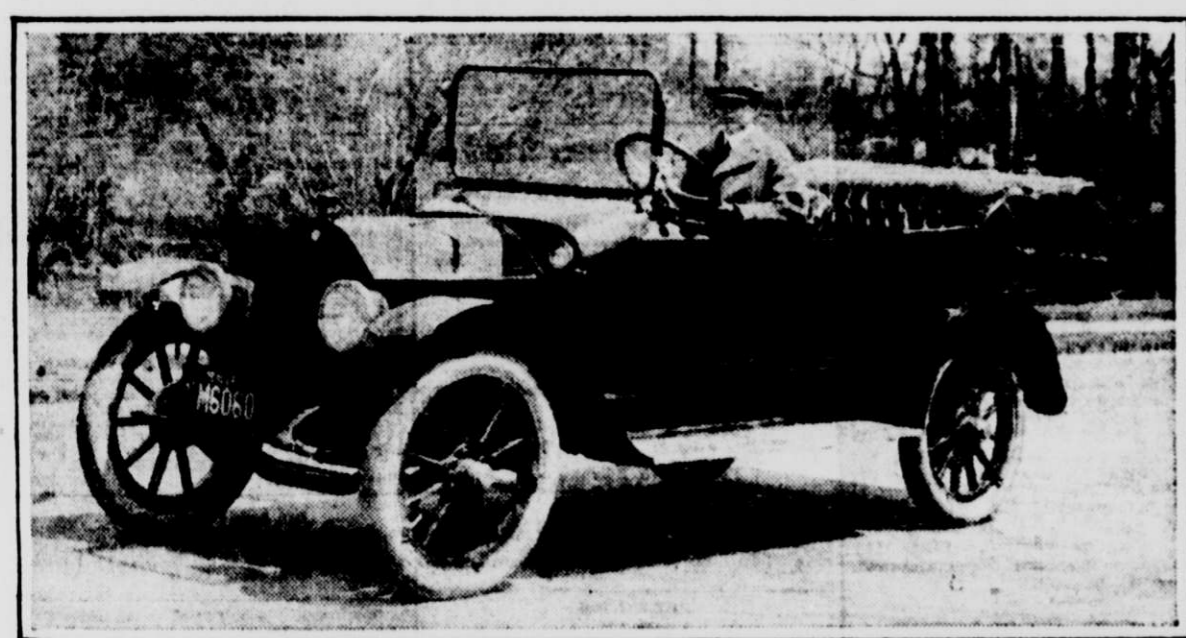
FINDS DEMAND ABOUT EVEN.

Both A. A. A. and B. A. A. Want.

That the American six is a pretty evenly divided between six and four cylinder models among medium priced cars is the conclusion drawn by the Marion Motor Car Company of Indianapolis. An examination of business done since the announcement of 1914 models reveals the fact that the shipments have been almost equally divided between four and sixes.

Until this season efforts have been confined to four cylinder models, but for the present year a light six was substituted for a heavy four previously marketed. These models have now been out a little over six months, giving a most equitable basis for the comparison. The results show an equality of demand for sixes and fours sustains our contention that there is a big field for both sixes and fours selling for \$2,150 and under, says J. H. Bump, president of the Marion company. "I do not believe that the time has yet come or is near at hand when the public will be unanimous in its demand for either four or sixes. It is entirely a question of personal needs and choice."

Jeffery Man Takes Motor Trip Through District



A. H. Humphreys, newly placed in charge of sales in the local Jeffery agency, has just returned from a trip through this district. He reports conditions as satisfactory and that he averaged 22 miles to the gallon of gasoline driving his Jeffery four.

along this line are comparatively easy the wonderful results are demonstrated only by the fast moving vehicle. This again comes back to the racing car for demonstration.

"Chassis development followed motor development closely, being taken up as early as 1906 or 1907. The need, however, for anything radical was not pressing until within the last three or four years. The matter of straight line drive with a low centre of gravity was the first pressing need developed in racing which has worked out wonderful results in stock practice. The matter of power transmission to the rear axle through the chassis frame in use has reached a high state of development, and in the case of the shaft drive, so well adapted to all types of cars and now in such common use, is its early development, I believe, entirely to racing."

"The search for lightness, so essential for the unsprung parts of the chassis for racing, led to the use of the best of all materials, making possible quietness as well as lightness. To just what extent this development would have reached in a short time, except for racing, is problematical, but my impression is that we would have been behind."

"Ease in riding is also a development resulting, I believe, directly from racing. In racing the need of easy riding qualities has been neglected to a great extent, but the necessity of being able to keep the wheels on the ground led to a great amount of experimenting to discover the best possible means for accomplishing it. All manner of soft, absorbing devices have been tried to the conclusion reached that the sprung and unsprung parts must necessarily bear a given ratio one to the other. These experiments disclosed the fact that easy riding was merely the result of keeping the wheels to the ground and was not, as commonly supposed, a factor to be considered by itself. While the value of the above is vividly illustrated in racing cars owing to the light weight desired by the body and passenger seat in pleasure vehicles relieve the necessity for lightness to a great extent.

"Spring suspension is also a matter worthy of consideration in stock as well as racing, but in the case of the pleasure car its line of development seems to have been somewhat neglected, everybody being content to follow the usual lines, itself unchanged, until recently. The breaking out of the so-called cantilever suspension is a big advance in the matter of light springing parts, placing as it does the work of the springs on the strong portion. I recently attempted the construction of driving through the mud rather than the radius rods in an attempt to overcome the tendency to break the spring and destroy the rib suspension, which happens in the case of driving through the front end. This I thought of as virtually pulling the car through the use of the semi-elliptic spring, fastened permanently to the rear end and attached to the front, my theory being that putting the spring under tension instead of compression would materially help the so-called rib action and do away with the necessity of increasing spring strength, as is necessary when driving through the front end.

"As to the six cylinder motor and the axle type of motor, neither seemed to have had its inception in racing. A close analysis of the inherent principles, I believe, will show that these motors were

to faulty piston rings in many cases. Knocking often occurs through pre-ignition caused by incombustible carbon in the combustion chamber resulting from surplus oil finding its way up past or through ill fitting piston rings. Or it is due to worn pistons slipping from side to side as the direction of pressure from the connecting rod changes.

Both faults can be corrected by the use of piston rings that insure proper fit to the piston head and stop all oil leakage. The one piece piston ring has defects that make it impossible to perform these functions adequately. In the first place it has an open slot that, however narrow, must furnish opportunity for oil to get up. Then its eccentric form cannot give an absolutely firm and equalized bearing on the entire circumference of the cylinder. And not only does such looseness as these rings develop occasion the extra friction and wear which knocking betrays, but they seriously reduce compression and lower power production.

The ideal piston ring must be leak-proof as to gas and oil and capable of securing such perfect adjustment of tension within the cylinder as will result in frictionless and noiseless operation always.

MAY COST SOME ONE A CAR.

But Moline People Say They Are Not Worried.

The first suggestion that the Moline-Knight challenge was being considered by any poppet valve motor car manufacturer was brought to the attention of the De Lamer-Hymer Automobile Company, metropolitan agents for the Moline, last week. The challenge in substance is that to any prospective customer who can get the maker of the car of his choice to state in writing that he will prove it to be better by subjecting the motor to the same test given the Moline-Knight \$1,000 and a car will be given free.

The customer obtaining the consent of the maker will receive from the Moline factory a check for \$1,000 immediately upon obtaining this written consent, and the Moline-Knight people will buy the car selected and turn the engine over to the Automobile Club of America, then when the test is finished give it and the car to the customer. One customer says he has obtained the oral acceptance of the makers, which he has put up to several makers, from the maker of a six cylinder car, and the Moline-Knight people are hopefully waiting for him to get this acceptance in writing.

HIGH MILEAGE NOT ALL.

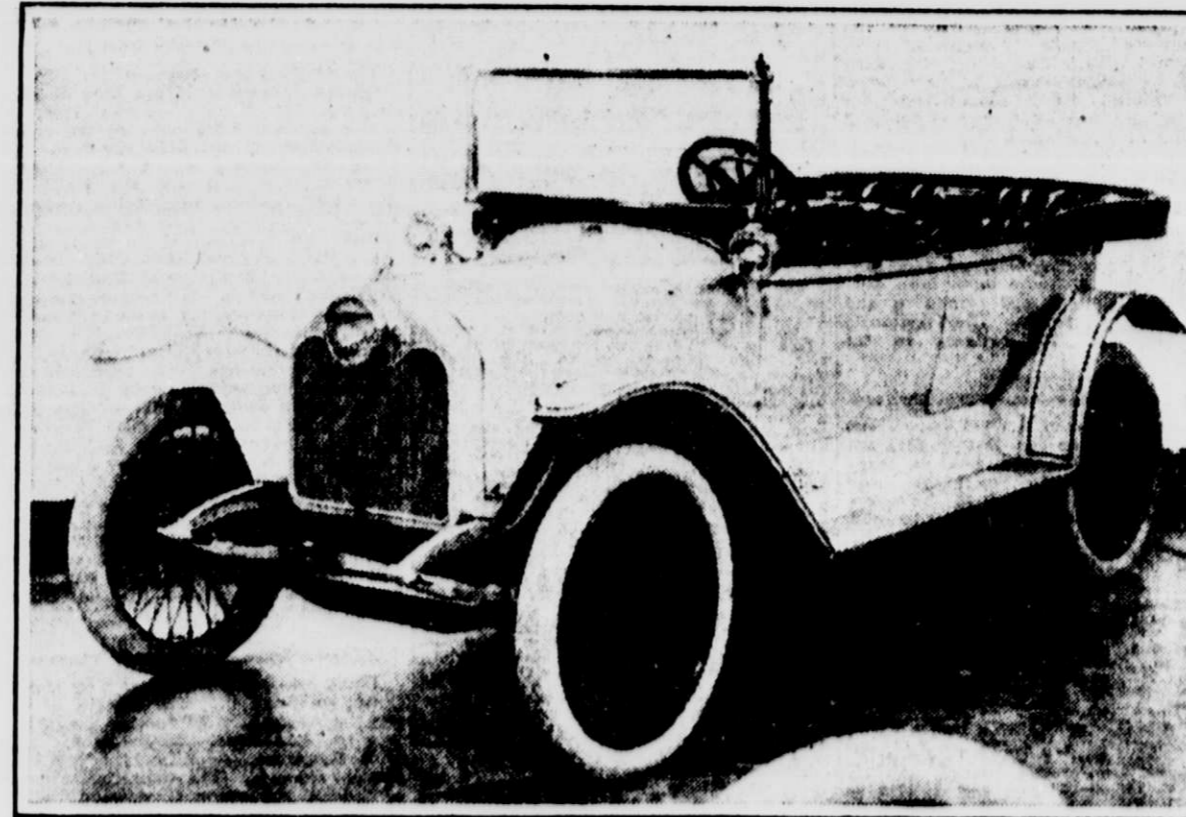
Hard Tire Compounds Not Most Desirable for Trucks.

By F. C. BLANCHARD, Firestone Tire and Rubber Company.

Many truck operators in purchasing tires are misled by the false appearance of mileage, not realizing that in purchasing tires on this basis they sacrifice other things more important.

There are two equally important points to be considered by the tire purchaser, efficiency and durability. The two words are not synonymous, for an efficient tire is not necessarily a tire of high mileage guarantee. The truck operator should

Briscoe Cars Will Be Here Soon



The new Briscoe car, which made a hit at the shows, will soon be here at the salesrooms of Partridge, Clark & Kerrigan, the local agents. E. S. Partridge has just returned from the Briscoe factory enthusiastic over what he saw there.